

IN THE CLAIMS

Please cancel claims 1-60 and add new claims 61-97 as follows:

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61. A method for screening members of a combinatorial library, the method comprising

- simultaneously flowing a test fluid through six or more vessels, each of the six or more vessels comprising a member of the combinatorial library,
- controlling the flowrate of the test fluid to be about the same in the six or more vessels by simultaneously flowing the test fluid through six or more flow restrictors, each of six or more flow restrictors providing fluid communication between one of the six or more vessels and (i) an entrance control volume, or alternatively, (ii) an exit control volume,
- simultaneously contacting at least six of the six or more library members with the test fluid in the six or more vessels,
- simultaneously detecting changes in the test fluid following contact with each of the six or more library members, and
- correlating the changes in the test fluid to a property of each of the six or more library members.

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62. A method for screening catalysts for a reaction of interest, the method comprising

- simultaneously feeding one or more reactants through six or more reaction vessels, each of the six or more vessels comprising a different candidate catalyst,
- controlling the flowrate of the one or more reactants to be about the same in the six or more reaction vessels by simultaneously flowing the one or more reactants through six or more flow restrictors, each of the six or more flow restrictors providing fluid communication between one of the six or more reaction vessels and (i) an entrance control volume, and additionally or alternatively, (ii) an exit control volume,

simultaneously contacting the candidate catalysts with the one or more reactants in the six or more reaction vessels under reaction conditions for the reaction of interest, and

simultaneously detecting resulting reaction products or unreacted reactants to determine the efficacy of the six or more catalyst candidates.

63. The method of claims 61 or 62 wherein the resistance to fluid flow within a given flow channel is greatest in the flow restrictor, and the resistance to flow in each of the six or more flow restrictors is approximately the same, such that maintaining a higher pressure in the entrance control volume than in the exit control volume results in simultaneous fluid flow through the at least six vessels that is apportioned approximately equally between each of the at least six vessels.

64. The method of claims 61 or 62 wherein each of the six or more flow restrictors provide fluid communication between one of the six or more reaction vessels and an entrance control volume.

65. A method for screening catalysts for a reaction of interest, the method comprising

feeding one or more reactants through one or more distribution valves to six or more reaction vessels, each of the six or more vessels comprising an inlet in fluid communication with an entrance control volume, an outlet in fluid communication with an exit control volume, and a different candidate catalyst in the reaction vessel, the one or more distribution valves providing selective fluid communication between the entrance control volume and the six or more reaction vessels,

contacting the six or more different candidate catalysts with the one or more reactants in the six or more reaction vessels under reaction conditions for the reaction of interest,

discharging reaction products and unreacted reactants, if any, from the six or more reaction vessels, through one or more selection valves to one or more detectors, the one

or more selection valves providing selective fluid communication between the six or more reaction vessels and the one or more detectors,

controlling the contact time to be about the same for each of the six or more candidate catalysts by synchronized operation of one or more distribution valves and the one or more selection valves, and

detecting resulting reaction products or unreacted reactants to determine the efficacy of the six or more catalyst candidates.

66. The method of claim 65 further comprising controlling the flowrate of the one or more reactants to be about the same in the six or more reaction vessels.

67. The method of claim 65 further comprising controlling the flowrate of the one or more reactants to be about the same in the six or more reaction vessels by flowing the one or more reactants through six or more flow restrictors, each of six or more flow restrictors providing fluid communication between one of the six or more vessels and (i) the one or more distribution valves, or alternatively, (ii) the one or more selection valves.

68. The method of claim 67 wherein the resistance to fluid flow within a given flow channel is greatest in the flow restrictor, and the resistance to flow in each of the six or more flow restrictors is approximately the same, such that maintaining a higher pressure in the entrance control volume than in the exit control volume results in fluid flow through the at least six vessels that is apportioned approximately equally between each of the at least six vessels.

69. The method of claim 67 wherein each of the six or more flow restrictors provide fluid communication between one of the six or more reaction vessels and the one or more distribution valves.

70. The method of claim 65 further comprising controlling the flowrate of the one or more reactants with to be about the same in the six or more reaction vessels by flowing the one or more reactants through one or more flow regulators.

71. The method of claim 65 wherein one or more reactants are fed simultaneously to two or more reaction vessels, two or more different candidate catalysts are contacted simultaneously with the one or more reactants in the two or more reaction vessels under reaction conditions for the reaction of interest, reaction products and unreacted reactants, if any, are discharged simultaneously from the two or more reaction vessels to the one or more detectors, and the resulting reaction products or unreacted reactants from the two or more reaction vessels are detected simultaneously.

72. A method for screening catalysts for a reaction of interest, the method comprising  
feeding one or more reactants through six or more reaction vessels, each of the six or more vessels comprising an inlet in fluid communication with an entrance control volume, an outlet in fluid communication with an exit control volume, and a different candidate catalyst in the reaction vessel,  
contacting the six or more different candidate catalysts with the one or more reactants in the six or more reaction vessels under reaction conditions for the reaction of interest,  
discharging reaction products and unreacted reactants, if any, from the six or more reaction vessels,  
sampling the discharged reaction products or unreacted reactants with a sampling probe, the sampling probe being in fluid communication with one or more detectors, and  
detecting the reaction products or unreacted reactants to determine the efficacy of the six or more catalyst candidates.

73. A method for screening catalysts for a reaction of interest, the method comprising  
feeding one or more reactants to a subset of six or more reaction vessels, each of the six or more vessels comprising an inlet in selective fluid communication with an entrance control volume, an outlet in fluid communication with an exit control volume, and a different candidate catalyst in the reaction vessel,

feeding an inert fluid to a remaining subset of the six or more reaction vessels,  
contacting the six or more different candidate catalysts with the one or more  
reactants in the six or more reaction vessels under reaction conditions for the reaction of  
interest,

discharging reaction products and unreacted reactants, if any, from the six or more  
reaction vessels, and

detecting the reaction products or unreacted reactants to determine the efficacy of  
the six or more catalyst candidates.

74. The method of claim 73 wherein the one or more reactants and the inert fluid  
are selectively fed to the six or more reaction vessels through a fluid distribution valve,  
the distribution valve providing selective fluid communication between one or more  
reactant sources and (i) the vessel inlets, or selectively, (ii) the exit control volume, the  
distribution valve further providing selective fluid communication between an inert fluid  
source and (i) the vessel inlets, or selectively, (ii) the exit control volume.

75. The method of claim 73 wherein the one or more reactants and the inert fluid  
are selectively fed to the six or more reaction vessels through a fluid distribution valve,  
the fluid distribution valve having a first valve portion, a second valve portion, and a  
plurality of exhaust conduits providing fluid communication between the fluid  
distribution valve and the exit control volume, the first valve portion providing selective  
fluid communication between a test fluid source and the vessel inlets and between the test  
fluid source and the exhaust conduits, the second valve portion providing selective fluid  
communication between an inert fluid source and the vessel inlets, and between the inert  
fluid source and the exhaust conduits, the resistance to fluid flow in each of the exhaust  
conduits being approximately the same.

76. A method for screening catalysts for a reaction of interest, the method  
comprising

directing one or more reactants to a first assembly of reaction vessels and,  
sequentially thereafter, to a second assembly of reaction vessels, such that the one or

more reactants are simultaneously fed through a first plurality of reaction vessels associated with the first assembly, and subsequently, simultaneously fed through a second plurality of reaction vessels associated with the second assembly, each of the reaction vessels comprising an inlet in fluid communication with an entrance control volume, an outlet in fluid communication with an exit control volume, and a different candidate catalyst in the reaction vessel,

contacting the different candidate catalysts with the one or more reactants in the first and second plurality of reaction vessels under reaction conditions for the reaction of interest,

discharging reaction products and unreacted reactants, if any, from the first and second plurality of reaction vessels, and

detecting the reaction products or unreacted reactants to determine the efficacy of the catalyst candidates.

77. The method of claim 76 wherein the first assembly and the second assembly each comprise six or more reaction vessels.

78. The method of claim 76 further comprising sequentially directing the one or more reactants to one or more additional assemblies of reaction vessels, such that the one or more reactants are fed simultaneously through the plurality of reaction vessels within an assembly, and sequentially between the reaction vessels of different assemblies.

79. The method of claim 76 wherein the one more reactants are sequentially directed to the first assembly and the second assembly through a distribution valve, the distribution valve providing selective fluid communication between the entrance control volume and a plurality of distribution valve outlet ports, each of the plurality of distribution valve outlet ports being in fluid communication with the plurality of reaction vessels within one of the two or more assemblies, such that a fluid can be sequentially directed into one of the distribution valve outlet ports, and then simultaneously through the plurality of reaction vessels of the assembly associated with the selected outlet port.

80. A method for screening catalysts for a reaction of interest, the method comprising

feeding one or more reactants through six or more reaction vessels in an assembly, each of the six or more vessels comprising an inlet in fluid communication with an entrance control volume, an outlet in fluid communication with an exit control volume, and a different candidate catalyst in the reaction vessel, the assembly comprising

a base block having a planar top surface and a bottom surface, the top surface of the base block having a plurality of wells formed therein,

a cover block having a planar bottom surface, the bottom surface of the cover block being disposed on the top surface of the base block and having a plurality of depressions formed therein, the cover block being removably attached to the base block with each of the plurality of depressions being in substantial alignment with one of the wells, such that the aligned depressions and wells form cavities for containing the vessels, and

vessel inlet ports and vessel outlet ports located on the bottom surface of the base block, each of the vessel inlet ports providing fluid communication with the inlet of only one of the vessels, and each of the vessel outlet ports providing fluid communication with the outlet of only one of the vessels,

contacting the six or more different candidate catalysts with the one or more reactants in the six or more reaction vessels under reaction conditions for the reaction of interest,

discharging reaction products and unreacted reactants, if any, from the six or more reaction vessels, and

detecting the reaction products or unreacted reactants to determine the efficacy of the six or more catalyst candidates.

81. A method for screening catalysts for a reaction of interest, the method comprising

feeding one or more reactants through six or more reaction vessels in an assembly, each of the six or more vessels comprising an inlet in fluid communication

with an entrance control volume, an outlet in fluid communication with an exit control volume, and a different candidate catalyst in the reaction vessel, the assembly comprising

a base block having a planar top surface and a bottom surface, the top surface of the base block having a plurality of wells formed therein,

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a cover block having a planar bottom surface, the bottom surface of the cover block being disposed on the top surface of the base block and having a plurality of depressions formed therein, the cover block being removably attached to the base block with each of the plurality of depressions being in substantial alignment with one of the wells, such that the aligned depressions and wells form cavities as vessels or for containing the vessels,

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a vessel inlet port located on the bottom surface of the base block, and vessel outlet ports located on the top surface of the cover block, the vessel inlet port providing fluid communication with an entrance control volume that provides fluid communication with the inlets of the vessels, each of the vessel outlet ports providing fluid communication with the outlet of only one of the vessels,

contacting the six or more different candidate catalysts with the one or more reactants in the six or more reaction vessels under reaction conditions for the reaction of interest,

discharging reaction products and unreacted reactants, if any, from the six or more reaction vessels, and

detecting the reaction products or unreacted reactants to determine the efficacy of the six or more catalyst candidates.

82. The method of claim 61 wherein the time from initial contact of a library member with the test fluid to detection of changes in the test fluid is approximately the same for each of the plurality of confined library members.

83. The method of claim 61 wherein the detecting step determines changes in the composition of the test fluid.



84. The method of claim 61 wherein the detecting step determines changes in the composition of the test fluid using gas chromatography, mass spectrometry, visible spectrometry, ultraviolet spectrometry, ultraviolet spectrometry or infrared spectrometry.

85. The method of claim 61 wherein the six or more library members are at least forty-eight library members.

86. The method of claim 61 wherein the total time to screen the six or more library members is less than about six minutes.

87. The method of claim 61 wherein the total time to screen the six or more library members is less than about three minutes.

88. The method of claim 61 wherein the six or more library members are at least forty-eight library members and the total time to screen the at least forty-eight library members is less than about forty-eight minutes.

89. The method of claim 61 wherein the six or more library members are at least forty-eight library members the total time to screen the at least forty-eight library members is less than about twenty-four minutes.

90. The method of claim 61 wherein the six or more library members are exposed to a uniform temperature or a temperature gradient during the test.

91. The method of claim 61 wherein about the same amount of each of the plurality of library members are present in the respective vessels.

92. The method of claim 61 wherein the test fluid is a gaseous test fluid.

93. The method of claim 61 wherein the test fluid is a liquid test fluid.